Before the
**FEDERAL COMMUNICATIONS COMMISSION** FCC 96-115
**Washington, D.C. 20554**

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| In the Matter of | ) | |
| | ) | |
| Amendment of Part 90 of the | ) | PR Docket No. 93-61 |
| Commission's Rules to Adopt | ) | |
| Regulations for Automatic Vehicle | ) | |
| Monitoring Systems | ) | |

# ORDER ON RECONSIDERATION

Adopted: March 18, 1996; Released: March 21, 1996

By the Commission: Commissioner Barrett concurring in part, dissenting in part and issuing a statement

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## I. INTRODUCTION AND BACKGROUND

1. In this *Order on Reconsideration*, we address several issues raised by petitions for reconsideration of our *Report and Order* in PR Docket No. 93-61[1], which established rules governing the licensing of the Location and Monitoring Service (LMS) in the 902-928 MHz band. Specifically, we modify and clarify certain aspects of our LMS rules in order to facilitate the expeditious construction and operation of LMS systems that must meet the April 1, 1996, deadline to attain grandfathered status.[2]

2. LMS encompasses both the Automatic Vehicle Monitoring (AVM) service established in 1974 and future advanced transportation-related services.[3] Existing AVM systems were authorized in the 903-912 and 918-927 MHz bands, as well as in several bands below 512 MHz. Existing LMS systems in these bands generally fall into one of two broad technological categories: multilateration systems and non-multilateration systems.[4] Multilateration systems use spread-spectrum technology to locate vehicles (and other moving objects) with great accuracy throughout a wide geographic area. Non-multilateration systems typically use narrowband technology to transmit data to and from vehicles passing through a particular location.[5]

3. In the *LMS Report and Order*, we stated our expectation that in the future both types of LMS systems will play an integral role in the development and implementation of a

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[1] Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems, *Report and Order*, PR Docket No. 93-61, 10 FCC Rcd 4695 (1995) (*LMS Report and Order*).

[2] Other issues raised by petitioners will be addressed in a forthcoming reconsideration order.

[3] *LMS Report and Order*, 10 FCC Rcd at 4696, ¶ 1.

[4] Under the Commission's Rules, a "multilateration LMS system" is defined as "a system that is designed to locate vehicles or other objects by measuring the difference of time of arrival, or difference in phase, of signals transmitted from a unit to a number of fixed points or from a number of fixed points to the unit to be located." 47 C.F.R. § 90.7. A "non-multilateration LMS system" is defined generally as "a system that employs any of a number of non-multilateration technologies to transmit information to and/or from vehicular units." *Id.*

[5] *LMS Report and Order*, 10 FCC Rcd at 4697, ¶ 4.

variety of advanced transportation-related services, known as "Intelligent Vehicle Highway Systems" (IVHS) or "Intelligent Transportation Systems" (ITS).[6] In fact, the underlying purpose for creating a new subpart for Transportation Infrastructure Radio Services (TIRS) in Part 90 of the Commission's Rules was the Commission's recognition of ITS's expected growth.[7] LMS, which we authorized to use the 902-928 MHz band, constitutes the first service contained within the TIRS category.

4. LMS systems, both multilateration and non-multilateration, and Part 15 devices will play an important role in providing many valuable services to the public in the future. In the *LMS Report and Order*, we developed a spectrum plan that is designed to accommodate these service providers' requirements to the extent possible. Aspects of the spectrum plan include: 1) continuing to permit secondary operations by unlicensed Part 15 devices across the entire band; 2) providing a "safe harbor" in which Part 15 devices may operate, along with a testing requirement to determine questions of interference from multilateration systems; 3) authorizing additional spectrum in the 902-928 MHz band in order to enable non-multilateration LMS systems to operate on spectrum separate from multilateration systems; and 4) permitting only one new multilateration provider in each sub-band of spectrum allocated for multilateration operations.[8]

5. In the *LMS Report and Order*, we decided to stop accepting applications for the operation of multilateration LMS systems in the 904-912 and 918-926 MHz bands under our current rules as of February 3, 1995.[9] In addition, we adopted certain grandfathering provisions that allowed existing, operating multilateration LMS systems until April 1, 1998, to complete the transition to the rules adopted in the *LMS Report and Order*.[10] These grandfathering provisions were adopted to prevent any undue hardship on existing, operating multilateration LMS systems. We also conferred grandfathered status on multilateration LMS licensees who had not constructed their systems so that such licensees may construct and operate their licensed stations under the rules adopted in the *LMS Report and Order*. We concluded, however, that such systems must be constructed and operational by April 1, 1996, and must comply with the rules adopted in the *LMS Report and Order* by that date. The *LMS Report and Order* directed existing licensees to file applications to modify their licenses to

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[6] *Id.* at 4698, ¶ 5. The term "Intelligent Vehicle Highway System" refers to the collection of advanced radio technologies that, among other things, are intended to improve the efficiency and safety of our nation's highways. Recently, both government and industry entities have begun referring to these technologies by the term "Intelligent Transportation System".

[7] *Id.*

[8] In some instances, a newly-licensed multilateration provider may have to share parts of its allotted spectrum with a pre-existing "grandfathered" multilateration licensee.

[9] *LMS Report and Order*, 10 FCC Rcd at 4728, ¶ 61.

[10] *Id.*

reflect operations consistent with the new band plan for multilateration systems.[11]

6. In addition to adopting a new spectrum plan and grandfathering provisions, the Commission resolved other technical issues in the *LMS Report and Order*. We established conditions under which Part 15 operations would not be considered to cause interference to multilateration licensees.[12] We allowed multilateration licensees to commence operations only after demonstrating efforts to minimize interference with Part 15 operations.[13]

7. In this *Order on Reconsideration*, we clarify our decision in the *LMS Report and Order* regarding the treatment of grandfathered LMS systems with respect to Part 15 interference testing. In addition, we clarify that the rule regarding non-interference by Part 15 devices set out in §90.361 applies to grandfathered LMS licensees that did not construct as of February 3, 1995, as well as future LMS licensees. We also consider modification of various technical rules, including emission mask specification, frequency tolerance, and site relocation, and we clarify our rules regarding type acceptance of LMS equipment. Any remaining issues raised in the petitions for reconsideration will be addressed in a later *Memorandum Opinion and Order*.[14]

8. It has been informally brought to our attention that some unbuilt LMS providers are concerned that they will not be able to complete construction by the April 1, 1996, deadline because they have delayed construction pending our resolution of the petitions for reconsideration. Moreover, the release of this *Order on Reconsideration* has been delayed because the Commission was closed due to the government shutdown that began in mid-December and due to the inclement weather that immediately followed. Accordingly, we believe that it would be appropriate to extend the build-out deadline by five months, to September 1, 1996. We recognize that because the 902-928 MHz frequency band is shared with federal government users, LMS operators are required to coordinate with the Interdepartmental Radio Advisory Committee (IRAC) concerning any proposed modifications to their systems. We are concerned that if existing licensees must await the completion of such frequency coordination process before commencing modifications to their systems, licensees may not have sufficient time to complete their system modifications by the build-out deadline. As a result, we conclude that these licensees should be permitted to begin modifications to their systems provided they have initiated the frequency coordination process

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[11] *Id.* at 4728-29, ¶¶ 61-64.

[12] *LMS Report and Order*, 10 FCC Rcd at 4714-15, ¶¶ 35-36.

[13] *Id.* at 4736-37, ¶¶ 81-82.

[14] While we do not address here specific issues raised by petitioners regarding interconnection to the public switched network, we remind grandfathered operators that we do not intend that LMS be used for general messaging purposes. *See LMS Report and Order*, 10 FCC Rcd at 4709, ¶ 26. The forthcoming *Memorandum Opinion and Order* will consider the issues regarding interconnection to the public switched network. It also will be accompanied by a *Notice of Proposed Rulemaking* proposing competitive bidding rules for LMS.

with IRAC and on the condition that the Commission's final approval of such modifications will be contingent upon the successful completion of such frequency coordination.[15] This procedure is consistent with our general approach for temporary and conditional operations under Part 90 of our Rules.[16]

9. In addition, On May 22, 1995, Southwestern Bell Mobile Systems (SBMS) filed a request for waiver of Section 90.363 of the Commission's Rules to grandfather SBMS applications that were pending as of the date the *LMS Report and Order* was adopted. SBMS contends that if its applications had been processed in 113 days as had been estimated by the Commission, its licenses would have been granted before the *LMS Report and Order* came out and would thus be eligible for grandfathering. Further, SBMS submits that it has been judicious in not applying for more licenses than needed for its LMS operations, while other applicants have warehoused spectrum by receiving licenses for systems that have remained unconstructed. SBMS notes that the Commission granted protected status to pending SMR applications based in part on the fact that there were processing delays at the Commission.[17]

10. We are not persuaded by SBMS that pending LMS applications should be eligible for grandfathering.[18] Our stated purpose in adopting grandfathering provisions was "[t]o ensure that our new licensing scheme does not impose undue hardship on existing, operating multilateration [LMS] systems," and to allow already-licensed systems the opportunity to construct and operate pursuant to the LMS rules adopted in the *LMS Report and Order*.[19] If some licensees are warehousing spectrum, as alleged by SBMS, then they will likely not construct in the time allotted so as to attain grandfathered status. That spectrum will then be available for competitive bidding by all prospective licensees, including SBMS if they so choose.

11. Further, the SMR example referred to by SBMS is distinguishable from the LMS situation. In the SMR context, the Commission adopted a grandfathering provision awarding certain secondary sites in the 900 MHz SMR service primary status so as to entitle them to

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[15] We note, however, that LMS operators are not required to notify IRAC of commencement of construction.

[16] See 47 C.F.R. §90.159. While IRAC coordination is required before the Commission will grant a construction permit for some services, we note that construction permits are not issued for LMS facilities.

[17] *See* Amendment of Parts 2 and 90 of the Commission's Rules to Provide for the Use of 200 Channels Outside the Designated Filing Areas in the 896-901 MHz and the 935-940 MHz Bands Allotted to the Specialized Mobile Radio Pool, *Second Report and Order and Second Further Notice of Proposed Rule Making*, PR Docket No. 89-553, PP Docket No. 93-253 and GN Docket No. 93-252, 10 FCC Rcd 6885, 6902-04 (1995) (*SMR Second Report and Order*).

[18] We note that a number of LMS applications were pending at the time the *LMS Report and Order* was adopted, although SBMS is the only applicant that has specifically requested waiver of the grandfathering rules.

[19] *LMS Report and Order* at 4728, ¶ 61.

full interference protection. On reconsideration, the Commission decided to grandfather pending applications for these secondary sites, concluding that this would promote service to the public, that the additional amount of protected spectrum would be *de minimis* and that such action would be equitable in light of processing delays.[20] A notable difference is that the 900 MHz SMR secondary sites were extensions of primary sites that were already licensed and constructed, while the LMS facilities at issue are unbuilt. Thus, it is questionable how service to the public would be facilitated by extending grandfathered status to sites that have not even been licensed, much less constructed. Moreover, grant of the pending applications could materially alter the LMS landscape by adding a number of additional sites and would thus not be a *de minimis* change. Accordingly, we decline SBMS's request and clarify that LMS applications filed prior to February 3, 1995, will not be eligible for grandfathering. SBMS also asks for an extension of the construction deadline for its pending applications. Because we are not affording SBMS grandfathered status with respect to these applications, this issue is moot. In addition, SBMS seeks a waiver of our rules to permit relocation of grandfathered sites by more than two kilometers and to add sites within a 75-mile radius. This same suggestion was made by petitioners for reconsideration and, for the reasons discussed *infra* in Section II-C-4, we deny SBMS's request.

## II. DISCUSSION

### A. Multilateration System Operations (Part 15 Testing)

12. Background. In the *LMS Report and Order*, the Commission adopted a spectrum band plan and established technical criteria for the operators of the various systems designed to minimize the potential for interference and provide a more conducive environment for sharing of the band by disparate services. Although this plan was crafted on the basis of an extensive record, we nonetheless recognized that additional testing would be beneficial. Thus, in an effort to ensure that the coexistence of the various services in the band would be as successful as possible, we decided to condition the grant of each MTA multilateration license on the licensee's ability to demonstrate through actual field tests that their systems do not cause unacceptable levels of interference to Part 15 devices. We noted that multilateration licensees may be able to employ technical refinements to minimize interference with Part 15 operations. We further expected that multilateration system users and Part 15 system operators would cooperate closely in designing and implementing testing procedures.[21]

13. Pleadings. Part 15 users request that grandfathered multilateration LMS systems be required to demonstrate through testing that their systems will not cause unacceptable interference to Part 15 devices. Specifically, Metricom/SCE seeks clarification that all new rule sections adopted in the *LMS Report and Order* apply to all grandfathered LMS systems

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[20] *SMR Second Report and Order* at 6904, ¶ 53.

[21] *LMS Report and Order*, 10 FCC Rcd at 4737, ¶ 82.

upon the issuance of a final order.[22] Further, some Part 15 petitioners suggest that the Commission establish guidelines for the testing of LMS systems and the demonstration of non-interference to Part 15 devices.[23] They argue that the test parameters should be uniform and that the testing should cover a reliable sample of the applicable technologies available in the area, to ensure that the tests are developed in a comprehensive and fair manner.[24]

14. However, some LMS providers contend that such testing of LMS systems is not necessary.[25] For example, Pinpoint contends that adopting a requirement to test a vague "standard" after spectrum has been auctioned and systems built is of questionable utility.[26] SBMS contends that because the probability of interference to Part 15 devices is de minimis, testing is not necessary.[27] In addition, some parties contend that the testing requirement violated the Administrative Procedure Act (APA) because testing procedures were not contemplated in the *Notice of Proposed Rule Making* in this proceeding and/or because testing requirements materially alter the Part 15 rules, which was not previously proposed.[28] Other parties believe that the testing requirement was a logical outgrowth of the proposals in the Notice and therefore does not exceed the Commission's discretion under the APA.[29]

15. Discussion. The *LMS Report and Order* stated that interference testing will be a condition precedent to receiving a multilateration LMS license. We hereby clarify that as a condition of grandfathering, we will also require all multilateration LMS operators who did not construct stations prior to February 3, 1995, to demonstrate through testing that their LMS systems will not cause unacceptable interference to Part 15 devices. As we stated in the *LMS*

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[22] Metricom/SCE Petition at 16. *See* Appendix A for a list of the acronyms used to cite parties filing petitions for reconsideration of the *LMS Report and Order*, oppositions thereto, and other associated pleadings.

[23] CellNet Petition at 7-8; Metricom/SCE Petition at 8-9; Ad Hoc Gas Petition at 18; Part 15 Coalition Petition at 15.

[24] Part 15 Coalition Petition at 15; Ad Hoc Gas Petition at 18-19; CellNet Petition at 7; Metricom/SCE Petition at 9-10.

[25] We note that Teletrac, MobileVision, Pinpoint, and Uniplex (collectively referred to as "The LMS Providers") filed an *ex parte* letter to reiterate their concerns regarding certain grandfathering and certain technical issues. *See* Letter from The LMS Providers to Rosalind K. Allen, Chief of Commercial Wireless Division, Wireless Telecommunications Bureau, Federal Communications Commission (FCC), dated August 22, 1995 (LMS Providers 8/22/95 Letter). We also note that SBMS filed an ex parte letter to support the concerns expressed in the LMS Providers 8/22/95 Letter. *See* Letter from SBMS to William F. Caton, Acting Secretary, FCC, dated September 21, 1995.

[26] Pinpoint Petition at 7.

[27] SBMS Petition at 8.

[28] *See, e.g.*, SBMS Petition at 7-8; Airtouch/Teletrac Opposition at 3.

[29] *See, e.g.*, Ad Hoc Comments at 11; EIA/CEG Comments at 5.

*Report and Order*, we believe that testing may provide users of the band with data that could contribute to "fine-tuning" system operations.[30] We reiterate that multilateration licensees may employ any one of a number of technical refinements, *i.e.*, limiting duty cycle, pulse duration power, *etc.*, to facilitate band sharing and minimize interference to Part 15 operations. Further, the Commission seeks to ensure not only that Part 15 operators refrain from causing harmful interference to LMS systems, but also that LMS systems are not operated in such a manner as to degrade, obstruct or interrupt Part 15 devices to such an extent that Part 15 operations will be negatively affected. Of course, if a Part 15 operator agrees to accept interference from a multilateration LMS provider, the LMS operator need not make further efforts to reduce interference.

16. We, however, deny petitioners' request to establish specific guidelines for Part 15 testing at this time. We recognize that LMS systems employ different methods to provide location and monitoring that are constantly changing to keep up with consumer demand. Moreover, the Part 15 industry has an even greater array of technologies that fluctuate in response to the needs of the public. It would be inappropriate to apply uniform testing parameters to those varied technologies, as no one testing method would adequately address the needs of either LMS or Part 15 operations. Instead, we believe that the more prudent course of action would be for LMS and Part 15 operators to work closely together to reach consensus on testing guidelines that satisfy their respective requirements.

17. We do not agree that our adopion of the testing requirement violated the APA. The APA requires an agency to provide the public with "either the terms or the substance of a proposed rule or a description of the subject and issues involved.[31] The APA, however, "does not require an agency to publish in advance every precise proposal which it may ultimately adopt as a rule."[32] Rather, the notice is sufficient if the final rule is a "logical outgrowth of the underlying proposal.[33] We believe that the testing requirement was a logical outgrowth of the Notice of Proposed Rule Making in this proceeding, which sought comment on ways to accommodate the various users of the 902-928 MHz band.[34] Moreover, the rules adopted in the *LMS Report and Order* do not modify our Part 15 rules by elevating the status of Part 15 providers, as alleged by some petitioners. Part 15 operation remain secondary; the testing requirement is merely an attempt to achieve the most efficient coexistence possible among the

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[30] *LMS Report and Order*, 10 FCC Rcd at 4737, ¶ 82.

[31] 5 U.S.C. § 553 (B)(3).

[32] *California Citizens Band Association v. United States*, 375 F.2d 43, 48 (9th Cir. 1967); *see also Spartan Radiocasting Co. v. FCC*, 619 F.2d 314 (4th Cir. 1980); *MCI v. FCC*, 57 F.3d 1136 (D.C. Cir. 1995).

[33] *United Steelworkers v. Marshall*, 647 F.2d 1189, 1221 (D.C. Cir. 1980); *see also Fertilizer Institute v. EPA*, 935 F.2d 1303 (D.C. Cir. 1991).

[34] Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems, *Notice of Proposed Rule Making*, PR Docket No. 93-61, 8 FCC Rcd 2502, 2507 (1993).

various users of the band.

## B. Accommodation of Secondary Users in the 902-928 MHz Band

18. Background. In the *LMS Report and Order*, we attempted to balance the equities and interests of each use of the 902-928 MHz band, including multilateration LMS systems and Part 15 users, without undermining the established relationship between unlicensed operations and licensed services. In this connection, we affirmed that unlicensed Part 15 devices in the 902-928 MHz band are secondary and, as in other bands, may not cause harmful interference to and must accept interference from all other operations in the band.[35] To accommodate the concerns of Part 15 users about their secondary status in light of multilateration LMS and our authorizing LMS to use the additional 8 MHz of the band (902-903, 912-918 and 927-928 MHz), however, we adopted rules that describe a "safe harbor" within which a Part 15 operation would be deemed not to cause interference to a multilateration LMS system.[36]

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[35] *LMS Report and Order* at 4714, ¶ 34 (citing 47 C.F.R. § 15.5(b)).

[36] *See LMS Report and Order* at 4715, ¶. A Part 15 system will not be considered to be causing interference to a multilateration LMS system if it is otherwise operating in accordance with the provisions of 47 C.F.R. § 15.1 *et seq.* and it meets at least one of the following conditions:

> (a) it is a Part 15 field disturbance sensor operating under Section 15.245 of the rules and it is not operating in the 904-909.750 or 919.750-928.00 MHz sub-bands; or
>
> (b) it does not employ an outdoor antenna; or
>
> (c) if it does employ an outdoor antenna, then if
>
> > (1) the directional gain of the antenna does not exceed 6dBi, or if the directional gain of the antenna exceeds 6dBi, it reduces its transmitter output power below 1 watt by the proportional amount that the directional gain of the antenna exceeds 6dBi; and
> >
> > (2) either
> >
> > (A) the antenna is 5 meters or less in height above ground; or
> > (B) the antenna is more than 5 meters in height above ground but less than or equal to 15 meters in height above ground and either:
> >
> > (i) adjusts it transmitter output power below 1 watt by 20 log (h/5) dB, where h is the height above ground of the antenna in meters; or
> > (ii) is providing the final link for communications of entities eligible under Subparts B or C of Part 90 of the rules.

19. Pleadings. Many petitioners agree that a safe harbor provision is necessary to provide Part 15 technologies protection against claims of interference from existing LMS licensees.[37] The Part 15 petitioners contend that the "safe harbor" provision as stated in the *LMS Report and Order* will shield them from interference complaints. They argue that this is the most appropriate way to facilitate the Commission's band sharing plan because LMS systems are highly susceptible to interference.[38] On the other hand, most LMS petitioners argue that they should be able to rebut any presumption of non-interference by Part 15 operators.[39] If not, they argue, a large class of Part 15 devices will be immune from complaints of interference to multilateration licensees. They also contend that such result would be contrary to the secondary status of Part 15 devices.[40]

20. Discussion. We hereby clarify that if Part 15 devices operate within the "safe harbor" provision they will be deemed not to cause harmful interference to LMS operators. In addition, this provision applies to all LMS licensees, including existing and grandfathered licensees. In the *LMS Report and Order*, we stated that a definition of what shall constitute harmful interference from amateur operations or unlicensed Part 15 devices to multilateration LMS systems would promote the cooperative use of the 902-928 MHz band.[41] We noted that this "safe harbor" approach would promote effective use of the 902-928 MHz band by the various services through establishing the parameters under which such devices may operate without risk of receiving complaints of interference from service providers with a higher allocation status. Based on the technical diversity of the numerous existing LMS systems and the multiplicity of Part 15 devices that eventually will be placed in operation, we previously concluded that some interference problems would remain unresolved under our rules.[42] As a result, we determined that by providing multilateration LMS system operators a means of recourse by way of complaint to the Commission only when a Part 15 device is not operating in the "safe harbor," the vast majority of equipment and services would be able to operate successfully in this band. Although the multilateration LMS system operators will not be able to file a complaint with the Commission where the Part 15 user has satisfied the "safe harbor" provisions, the Commission encourages LMS operators to resolve the interference by modifying their systems or by obtaining the voluntary cooperation of the Part 15 user. We disagree that such a result is inconsistent with the secondary status of Part 15 devices under

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[37] CellNet Petition at 3; Part 15 Coalition Petition at 12-13; MobileVision Petition at 13; Pinpoint Petition at 23; Uniplex Opposition at 2.

[38] Metricom/SCE Opposition at 7; CellNet Opposition at 5-7; ATA Opposition at 5-6; Connectivity for Higher Learning Opposition at 4-6.

[39] MobileVision Petition at 13; Pinpoint Petition at 23; SBMS Petition at 9; Teletrac Petition at 6.

[40] Pinpoint Petition at 7; SBMS Petition at 11; Teletrac Opposition at 4; MobileVision Opposition at 9-10.

[41] *LMS Report and Order*, 10 FCC Rcd at 4715, ¶ 36

[42] *Id.* at 4716, ¶ 37.

our Rules. Rather, we believe our approach will assure the efficient and equitable use of the 902-928 MHz band.

## C. Technical Issues

### 1. Emission Mask Specification

21. Background. In the *LMS Report and Order*, we required that licensees' emissions be attenuated by at least 55 + 10 log(P) dB at the edges of the specified LMS subbands.[43] The band edges for multilateration systems where emissions must be attenuated are 904, 909.75, 919.75, 921.75, 927.50, 927.75 and 928 MHz. If the 919.75-921.75 and 921.75-927.25 MHz subbands were aggregated by a single licensee, the emission mask limitations at the band edges at 921.75 and 927.50 MHz may be ignored. The band edges for non-multilateration systems where emissions must be attenuated are 902, 904, 909.75 and 921.75 MHz. These emission limitations were designed to assure that multilateration and non-multilateration systems will not interfere with each other and that operations below 902 MHz and above 928 MHz are protected.[44]

22. Pleadings. The LMS Providers contend that the emission mask adopted in the *LMS Report and Order* is "flawed and makes multilateration LMS impractical and economically unattractive."[45] MobileVision argues that "the inability to meet the specification is not a technical deficiency of a specific provider but is a consequence of the physical laws governing the processes involved in multilateration LMS systems."[46] The LMS Providers propose a modification of the present emission mask specification that they believe strikes an appropriate compromise.[47] They assert that their proposed emission mask should not inhibit the operation of non-multilateration systems, and the emission levels outside of the

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[43] *Id.* at 4744, ¶ 98. This rule is reflected in new rule §90.209(m).

[44] *Id.* at 4695, ¶ 98.

[45] LMS Providers 8/22/95 Letter.

[46] MobileVision Petition at 10.

[47] LMS Providers 8/22/95 Letter. The LMS Providers also propose to modify LMS narrowband forward link emissions as follows:

> The power of any emission shall be attenuated below the transmitter power (P), in accordance with following schedule:
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> > - on any frequency outside the authorized sub-band and removed from the edge of the authorized sub-band by a displacement frequency (fd in kHz): at least 116 log10 ((fd + 10)/6.1) decibels or 50 + 10 log 10(P) decibels or 70 decibels, whichever is the lesser attenuation. A minimum spectrum analyzer resolution bandwidth of 300 Hz shall be used when showing compliance.

multilateration LMS sub-bands would be below the field strength levels permitted under Part 15 of the Commission's Rules for operation within the 902-928 MHz band.[48] The proposed emission mask specification is as follows:

> For LMS wideband emissions, operating in the 902-928 MHz band, in any 100 kHz band, the center frequency of which is removed from the center of authorized sub-band(s) by more than 50 percent up to and including 250 percent of the authorized bandwidth: The mean power of emissions shall be attenuated below the maximum permitted output power, as specified by the following equation but in no case less than 31dB:
>
> A= 16 + 0.4 (P-50) + 10logB (attenuation greater than 66dB is not required)
>
> where A= attenuation (in decibels) below the maximum permitted output power level
>
> P= percent removed from the center of the authorized sub-band(s)
>
> B= authorized bandwidth in megahertz

23. On the other hand, CellNet, a Part 15 operator, objects to the relaxation of the emission mask specification, contending that the potential for interference to Part 15 devices will be increased if the emission mask requirements are relaxed.[49] Hughes contends that the attenuation used in the formula proposed by the LMS Providers would be insufficient to protect adequately against interference in the portion of the spectrum band set aside for non-multilateration systems.[50] Thus, Hughes proposes a variation of the LMS multilateration parties' formula that requires greater attenuation. Hughes argues that this is necessary to avoid significant risk of interference in the non-multilateration band.[51] The Part 15 Coalition contends that there is no justification for relaxing the emission mask standard.[52] TIA opposes the justification used by the LMS Providers to modify the emission mask specification.[53] TIA points out that the LMS Providers' proposal is very similar to Sections 21.106(a)(2) and 94.71(c)(2) of our rules, which specify emission limits for the Domestic Public Fixed Radio

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[48] Letter from Teletrac, MobileVision, PentaPage, and Pinpoint to William F. Caton, Acting Secretary, FCC, dated July 26, 1995.

[49] CellNet Opposition at 4.

[50] Hughes Opposition at 12, Figure 1.

[51] *Id.* at 13, Figure 2.

[52] Part 15 Coalition Opposition at 16.

[53] TIA Comments at 8.

Services and Private Operational Fixed Microwave Service, respectively.[54] Further, TIA contends that in fixed services, the emission is but one of several ways to prevent interference, while in mobile services emission masks and power limits are the primary forms of interference control.[55] It contends that while it may be appropriate to base the limits of LMS wideband emissions on the limits that apply to high-speed digital microwave transmissions, "it is not reasonable that the LMS specification should be less stringent than the fixed microwave specification."[56]

24. Discussion. We find that the LMS Providers have shown that the single emission mask we adopted in the *Report and Order* to cover all LMS operations in the 902-928 MHz band is not appropriate for multilateration LMS systems. In fact, the LMS Providers have stated that none of their various multilateration systems, either existing or proposed, can comply with the existing mask and still achieve a commercially marketable level of locating accuracy.[57] Additionally, the LMS providers have persuaded us that an emission mask similar to the one applicable to narrowband PCS channels is more appropriate for narrowband forward link equipment operating in the spectrum between 927.250 MHz and 928 MHz.

25. Therefore, we will not apply the existing mask to equipment used for wideband multilateration links, either forward or reverse, in the three subbands 904-909.75 MHz, 921.75-927.25 MHz and 919.75-921.75 MHz, or to equipment used for narrowband forward links in the spectrum between 927.25 and 928 MHz. Instead we will adopt two additional emission masks, both essentially the same as proposed by the LMS Providers, that will apply to this equipment.[58] All other equipment to operate in the LMS will remain subject to the emission mask we adopted in the *Report and Order*. We emphasize that this modification of the emission mask is based on the band plan and Part 15 interference criteria specified in the *Report and Order*. Petitions for reconsideration of the band plan and Part 15 interference criteria will be addressed in a future reconsideration order. Our decision to rely on current rules for purposes of resolving the emission mask issue is not to be taken as an indication that we will not consider modifications to the band plan or Part 15 interference criteria on

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[54] *Id.* at 7. *See* 47 C.F.R. §§ 21.106(a)(2) and 94.71(c)(2).

[55] *Id.* at 8.

[56] TIA Comments at 8.

[57] In order to comply with the existing mask, multilateration equipment would have to operate at a lower "chipping rate," which would significantly reduce the accuracy of multilateration systems.

[58] We are modifying the language the LMS Providers submitted slightly as follows: (1) to require that all measurements be made using peak power, which is more appropriate for wideband pulse emissions, rather than mean power; (2) to require appropriate instrumentation resolution bandwidths, to facilitate measurements; and (3) to drop the reference to a 250% limit on the displacement frequency factor, which has no effect on the attenuation slope, but might be misconstrued to imply that harmonic emission attenuation beyond 250% of the authorized bandwidth is not required. We have also made other non-substantive modifications to the LMS Providers' language for purposes of administrative consistency.

reconsideration.

26. Although these new emission masks are less stringent than the one we adopted in the *Report and Order*, they do require a greater attenuation of out-of-band emissions than was considered to be required for multilateration systems operating under the interim rules. We further believe that these masks are adequate to prevent interference to non-multilateration systems. While TIA is correct that these new masks are less stringent than those for fixed microwave links, we do not agree with TIA that the masks for LMS multilateration systems must necessarily be more strict than for fixed microwave links.[59] These two services are very different and the expectations of potential interference must also be considerably different -- one is a highly coordinated fixed microwave service in exclusively allocated spectrum and the other is a mobile multilateration system operating in spectrum shared with a multitude of other users. Also, we are not persuaded that the refinement suggested by Hughes (increasing the slope of the wideband mask) is necessary to prevent interference, and we are concerned that to adopt it might unnecessarily preclude the use of some technologies or favor one type of system over another.

### 2. Frequency Tolerance

27. Background. In the *LMS Report and Order* we adopted a frequency tolerance of 0.00025 percent (2.5 parts per million (ppm)) for both multilateration and non-multilateration systems. We noted that tighter frequency tolerances were justified to help reduce the potential for interference to systems operating on adjacent frequencies.[60]

28. Pleadings. Hughes, TI/MFS, and AMTECH request that the Commission relax the frequency tolerance.[61] Hughes argues that the 0.00025 percent frequency tolerance is overly restrictive for non-multilateration systems.[62] It contends that a frequency tolerance of 2.5 ppm does not add significantly to existing means of avoiding interference between non-multilateration systems within designated subbands.[63] Hughes submits that since non-multilateration systems operate over relatively short ranges, the instances of coverage overlap between facilities on adjacent channels will be rare.[64]

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[59] The emission mask we are adopting for LMS wideband emissions is similar in format to a mask contained in § 21.106 of our rules governing the fixed microwave service, for digital microwave emissions, in that both have an attenuation factor based on authorized bandwidth.

[60] *LMS Report and Order*, 10 FCC Rcd at 4741, ¶ 91.

[61] Hughes Petition at 9-11; TI/MFS Petition at 5-6; AMTECH Petition at 13.

[62] Hughes Petition at 1.

[63] *Id.* at 11.

[64] *Id.* at 11.

29. Hughes further alleges that the present frequency tolerance level would necessitate a significant and expensive design modification for their Vehicle to Roadside Communications (VRC) system readers. In addition, they contend that equipment changes required to conform their VRC mobile transponders to the present frequency tolerance level would be economically prohibitive.[65] If the Commission decides to maintain the present frequency tolerance level for non-multilateration systems, Hughes requests that the Commission apply the frequency tolerance level only to the reader transmitters and not to the mobile transponders, which are designed to transmit with extremely low power and only while passing in close proximity to a reader.[66]

30. According to TI/MFS there are no current LMS non-multilateration systems in operation that conform to the 2.5 ppm frequency tolerance. They note that most of the non-multilateration technology operates at frequency tolerance levels no greater than 50 ppm. TI/MFS believes that the imposition of the present frequency tolerance level will have the negative effect of decreasing both available technology and potential players in the market.[67]

31. Discussion. In response to the concerns raised by the non-multilateration system operators, we will impose the present frequency tolerance level of 2.5 ppm on high power fixed reader transmitters operating near the band edges, but not on mobile transponders or hand-held portable readers. We are persuaded that the significant cost of tightening the frequency tolerance for mobile transponders and hand-held readers could severely raise the cost of the devices beyond the realm of economic feasibility. Thus, Section 90.213 of our Rules will be modified accordingly.[68] We are not changing the tolerance requirement for other non-mulitilateration LMS systems or for multilateration LMS systems.

### 3. Type Acceptance

32. Background. In the *LMS Report and Order,* we determined that the mobile nature of most LMS transmitters and the new advanced technology that will be employed by this equipment justified strict regulatory oversight of having equipment type accepted rather than continuing to use the notification procedure. Therefore, we decided that all LMS equipment imported or marketed after April 1, 1996, including the "transmitting tags" used in certain non-multilateration systems, must be type accepted for use under Part 90 of our Rules. If, however, these units met the requirements under Part 15 of our Rules, they may have been

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[65] *Id.* at 8.

[66] *Id.* at 13.

[67] TI/MFS Petition at 5-6.

[68] *See* Appendix C.

authorized under that part and do not need to be type accepted.[69]

33. Pleadings. The LMS Providers insist that because their initial emphasis under the new rules is on the preservation of grandfathered status through the construction of systems that meet the FCC's technical requirements, formal compliance with type acceptance should assume a lower priority. They request that for systems constructed after February 3, 1995, that the type acceptance requirement for multilateration LMS be extended from the current date of April 1, 1996, until 12 months after any rule on reconsideration concerning the emission mask (the "1996 Effective Date").[70] The LMS Providers also request that all LMS transmitters imported or manufactured domestically prior to the 1996 Effective Date be exempt from type acceptance regardless of whether they are used before or after the 1996 Effective Date. In addition, they ask the Commission to clarify that LMS providers may indefinitely continue to use equipment deployed prior to the 1996 Effective Date provided that it is not marketed after that date (whether the deadline is April 1, 1996 or a later date), unless the equipment is first type accepted.[71]

34. The LMS Providers further request that for systems constructed before February 3, 1995, the installation of non-type accepted multilateration LMS transmitters imported or manufactured domestically on or before the 1996 Effective Date should be permitted through April 1, 1998. They urge that such equipment need not be type-accepted at any time unless such a step is necessary in order to resolve interference problems that cannot otherwise be accommodated, but that such equipment must comply with the emission mask requirements by April 1, 1998. In addition, for systems constructed and placed into operation before February 3, 1995, LMS Providers would mandate that transmitters imported or manufactured after the 1996 Effective Date must be type accepted.[72] Similarly, AMTECH believes that because some or all of the technical requirements adopted in the *LMS Report and Order* will change, presumably due to pending petitions for reconsideration, its efforts to comply with those rules may turn out to be unnecessary. In light of this, AMTECH requests that the Commission delay the type-acceptance date at least until 12 months after final technical requirements have been adopted.[73]

35. Discussion. We believe that the type acceptance requirements we have adopted are necessary to ensure efficient deployment of LMS to the public without causing significant interference. We recognize the concern of multilateration LMS operators that they may experience difficulty in meeting the construction deadline if they must comply with type

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[69] *LMS Report and Order*, 10 FCC Rcd at 4739, ¶ 88.

[70] LMS Providers 8/22/95 Letter.

[71] *Id.*

[72] *Id.*

[73] AMTECH Petition at 15-16.

acceptance requirements. To alleviate this concern, the Office of Engineering and Technology has committed to process type acceptance applications within 40 days of receipt. Further, we have in this item extended the construction deadline.[74] Thus, we conclude that compliance with these type acceptance requirements should not impede a licensee's efforts to meet the build-out deadline. We note that constructed multilateration LMS systems must also meet type acceptance requirements after September 1, 1996.

36. With respect to non-multilateration systems, we recognize that these systems contain a substantial amount of embedded equipment with numerous users, particularly state and local governments. Thus, non-multilateration system operators will be able to continue operation of current equipment until replacement is needed. However, if non-multilateration system operators decide either to build new systems or replace existing equipment on or after September 1, 1996, the new equipment must comply with type acceptance by April 1, 1998.[75] Because non-multilateration LMS systems do not present a significant potential for interference, we believe that this decision will minimize the disruption, if any, to existing operations.

**4. Site Relocation**

37. Background. In the *LMS Report and Order*, we allowed LMS licensees to modify their applications to comply with the new band plan. In this connection, we stated that an alternate site must be within two kilometers (km) of the site specified in the original license.[76]

38. Pleadings. The LMS Providers contend that the two kilometer restriction is unworkable due to the upcoming April 1, 1996, deadline for preserving grandfathered status. They argue that competition for wireless facilities has caused many sites to become unavailable or unsuitable for LMS use. They also note that site surveys and negotiations are time-consuming and in many cases replacements within the 2 km radius either do not exist or are unavailable. Thus, the LMS Providers propose that the Commission instead allow replacement sites within a ten-mile radius.[77]

39. Discussion. We are unpersuaded by the argument of the LMS Providers. In the

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[74] *See supra* ¶ 8.

[75] To the extent that this decision is inconsistent with March 22, 1995, letter sent by Rosalind K. Allen, Chief of the Commercial Wireless Division, Wireless Telecommunications Bureau, FCC, in response to Mark IV Industries', February 15, 1995, request to clarify some type acceptance issues, that letter is hereby overruled.

[76] *See LMS Report and Order*, 10 FCC Rcd 4728 at ¶ 63.

[77] LMS Providers 8/22/95 Letter, *supra*, n.25.

*Third Report and Order* in GN Docket No. 93-252,[78] we utilized two kilometers as the benchmark for determining whether an application for a site change of a CMRS facility is to be treated as a modification application or an "initial" application for the purpose of determining eligibility for competitive bidding procedures.[79] The LMS Providers have failed to demonstrate adequately that a different benchmark should apply in the LMS context. Thus, we will continue to place a 2 km restriction on replacement sites for LMS systems. We reiterate, however, that our decision here to use a 2 km replacement site restriction does not indicate that we have determined the regulatory status of multilateration LMS systems (*i.e.*, whether LMS is a Commercial Mobile Radio Service (CMRS)). We will review the regulatory status of multilateration LMS systems in our forthcoming *Memorandum Opinion and Order*.

## III. CONCLUSION

40. We believe that the clarifications and modifications adopted in this Order will facilitate the timely construction of LMS systems. We have strived to fairly balance the diverse interests of the parties involved, keeping in mind our objective of allowing for the continued growth of LMS services and advancing Congress' goal of developing an intelligent transportation system infrastructure. At the same time, we have attempted to ensure that amateur operators and Part 15 users will be able to share this band with LMS providers without substantial disruption to their operations.

## IV. PROCEDURAL MATTERS AND ORDERING CLAUSES

41. The Final Regulatory Flexibility Analysis, as required by Section 604 of the Regulatory Flexibility Act of 1980,[80] is set forth in Appendix B.

42. IT IS ORDERED that, pursuant to the authority of Sections 4(i), 302, 303(r), and 332(a)(2) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 302, 303(r), and 332(a), the rule changes specified in Appendix C are adopted.

43. IT IS FURTHER ORDERED that the rule changes set forth in Appendix C WILL BECOME EFFECTIVE 30 days after publication in the Federal Register, except for Sections 90.203(b)(7) and 90.363(d). Sections 90.203(b)(7) and 90.363(d) ARE EFFECTIVE upon

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[78] *See* Implementation of Sections 3(n) and 332 of the Communications Act- Regulatory Treatment of Mobile Services, *Third Report and Order*, GN Docket No. 93-252, 9 FCC Rcd 7988 (1994) (*CMRS Third Report and Order*).

[79] *Id.* at 8415, ¶356.

[80] 5 U.S.C. §604.

adoption of this Order on Reconsideration.[81]

44. IT IS FURTHER ORDERED THAT the petitions for reconsideration filed by the parties listed in Appendix A ARE GRANTED to the extent discussed herein, and DENIED to the extent discussed herein. Those issues not resolved by this *Order on Reconsideration* will addressed in a future *Memorandum Opinion and Order.*

FEDERAL COMMUNICATIONS COMMISSION

William F. Caton
Acting Secretary

[81]Sections 90.203(b)(7) and 90.363(d) extend the type acceptance and construction deadlines, respectively, from April 1, 1996, to September 1, 1996. As such, these rules relieve a restriction and are not subject to the 30 days' notice requirement of the Administrative Procedure Act (APA). *See* 5 U.S.C. § 553(d)(1). Moreover, the Commission finds good cause to make these rules effective on less than 30 days' notice to prevent the former type acceptance and construction deadline of April 1, 1996, from taking effect. *See* 5 U.S.C. § 553(d)(3).

## APPENDIX A

## PLEADINGS

Petitioners

1. Ad Hoc Gas Distribution Utilities Coalition (Ad Hoc Gas)
2. AirTouch Teletrac (Teletrac)
3. The American Radio Relay League, Inc. (ARRL)
4. AMTECH Corporation (AMTECH)
5. CellNet Data Systems, Inc. (CellNet)
6. Connectivity for Learning Coalition
7. Hughes Transportation Management Systems (Hughes)
8. Intelligent Transportation Society of America (ITSA)
9. Metricom, Inc. and Southern California Edison Company (Metricom/SCE)
10. MobileVision, L.P. (MobileVision)
11. The New Jersey Highway Authority, the New Jersey Turnpike Authority, the New York State Thruway Authority, the Pennsylvania Turnpike Commission, the Metropolitan Transportation Authority Bridges and Tunnels, the Port Authority of New York and New Jersey, the South Jersey Transportation Authority and the Delaware River Port Authority ("the Interagency Group").
12. The Part 15 Coalition (Part 15 Coalition)
13. Pinpoint Communications (Pinpoint)
14. Rand McNally & Company (Rand McNally)
15. Safetran Systems Corporation (Safetran)
16. Southwestern Bell Mobile Systems, Inc. (SBMS)

17. Texas Instruments, Inc. and MFS Network Technologies, Inc. (TI/MFS)

18. Uniplex Corporation (Uniplex)

19. UTC

20. Wireless Transactions Corporation (Wireless Transactions)

**Oppositions**

1. Airtouch Teletrac (Teletrac)

2. American Telemedicine Association (ATA)

3. AMTECH Corporation (AMTECH)

4. Association of American Railroads (AAR)

5. CellNet Data Systems (CellNet)

6. Connectivity for Learning Coalition

7. Hughes Transportation Management Systems (Hughes)

8. Itron Inc. (Itron)

9. Metricom, Inc. and Southern California Edison (Metricom/SCE)

10. Mobilevision, L.P. (MobileVision)

11. Part 15 Coalition (Part 15 Coalition)

12. Pinpoint Communications, Inc. (Pinpoint)

13. Southwestern Bell Mobile Services (SBMS)

14. Texas Instruments, Inc. (TI)

15. Uniplex Corporation (Uniplex)

**Comments on Petitions for Reconsideration**

1. Ad Hoc Gas Distribution Utilities Coalition (Ad Hoc Gas)

2. Alarm Industry Communications Committee (Alarm Industry)

3. AT&T Corp. (AT&T)

4. Electronic Industries Association, Consumer Electronic Group (Electronic Industries)

5. Symbol Technologies, Inc. (Symbol)

6. Telecommunications Industry Association, User Premises Equipment Division, Wireless Consumer Communications Section (TIA)

7. UTC

**Replies**

1. Ad Hoc Gas Distribution Utilities Coalition (Ad Hoc Gas)

2. AirTouch Teletrac (Teletrac)

3. Amtech Corporation (Amtech)

4. AT&T Corp. (AT&T)

5. CellNet Data Systems, Inc. (CellNet)

6. The Connectivity for Learning Coalition

7. Electronic Industries Association, Consumer Electronics Group (Electronic Industries)

8. Hughes Transportation Management Systems (Hughes)

9. Itron, Inc. (Itron)

10. Mark IV Industries, Lt., I.V.H.S. Division (Mark IV)

11. Metricom, Inc., and Southern California Edison Company (Metricom/SCE)

12. MobileVision, L.P. (MobileVision)

13. Part 15 Coalition (Part 15 Coalition)

14. Pinpoint Communications (Pinpoint)

15. Southwestern Bell Mobile Systems (SBMS)

16. Telecommunications Industry Association, User Premises Equipment Division, Wireless Consumer Communications Section (TIA)

17. Texas Instruments, Inc. and MFS Network Technologies, Inc. (TI/MFS)

18. UTC

**Other Correspondence**

1. Faisal Khan

2. Dr. Jim Lansford

## APPENDIX B

## FINAL REGULATORY FLEXIBILITY ANALYSIS

Pursuant to the Regulatory Flexibility Act of 1980, the Commission's final analysis is as follows:

### A. Need and Purpose of this Action

The rules adopted herein will enhance use of the 902-928 MHz band for location and monitoring systems. The new rules create a more stable environment for LMS system licensees and provides much needed flexibility for operators of such systems.

### B. Issues Raised in Response to the Initial Regulatory Flexibility Analysis

There were no comments submitted in response to the Initial Regulatory Flexibility Analysis.

### C. Significant Alternatives Considered and Rejected

All significant alternatives regarding grandfathering issues are discussed in this Order on Reconsideration. Other issues raised on reconsideration will be addressed in a forthcoming Memorandum Opinion and Order.

## APPENDIX C

## RULE CHANGES

Part 90 of Chapter 1 of Title 47 of the Code of Federal Regulations is amended as follows:

**PART 90 - PRIVATE LAND MOBILE RADIO SERVICES**

1. The authority citation for Part 90 continues to read as follows:

> Authority: Secs. 4, 303, 48 Stat. 1066, 1082, as amended; 47 U.S.C. 154, 303, and 332, unless otherwise noted.

2. Section 90.203 is amending by revising paragraph (b)(7) as follows:

**§ 90.203 Type acceptance required.**

* * * * *

(b) * * *

(7) Transmitters imported and marketed prior to September 1, 1996 for use by LMS systems.

* * * * *

3. Section 90.209 is amended by revising paragraphs (e) and (m) as follows:

**§ 90.209 Bandwidth limitations.**

* * * * *

(e) When radiation in excess of that specified in paragraphs (c), (d), and (m) of this section results in harmful interference, the Commission may require, among other available remedies, appropriate technical changes in equipment to alleviate the interference.

* * * * *

(m) (1) *Wideband multilateration transmitters.* For transmitters authorized under Subpart M to provide forward or reverse links in a multilateration system in the subbands 904-909.75 MHz, 921.75-927.25 MHz and 919.75-921.75 MHz, and which transmit an emission occupying more than 50 kHz bandwidth: in any 100 kHz band, the center frequency of which is removed from the center of authorized sub-band(s) by more than 50 percent of